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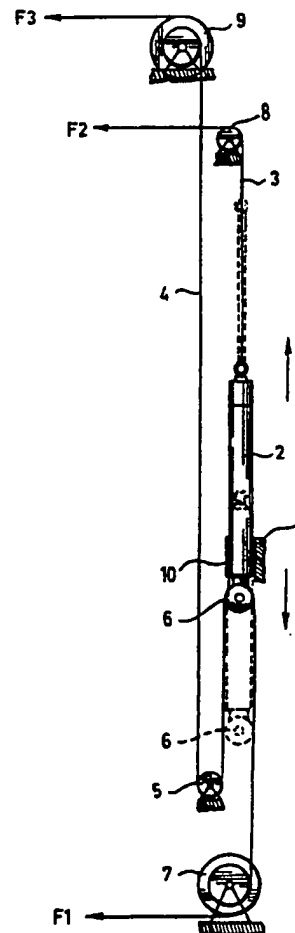
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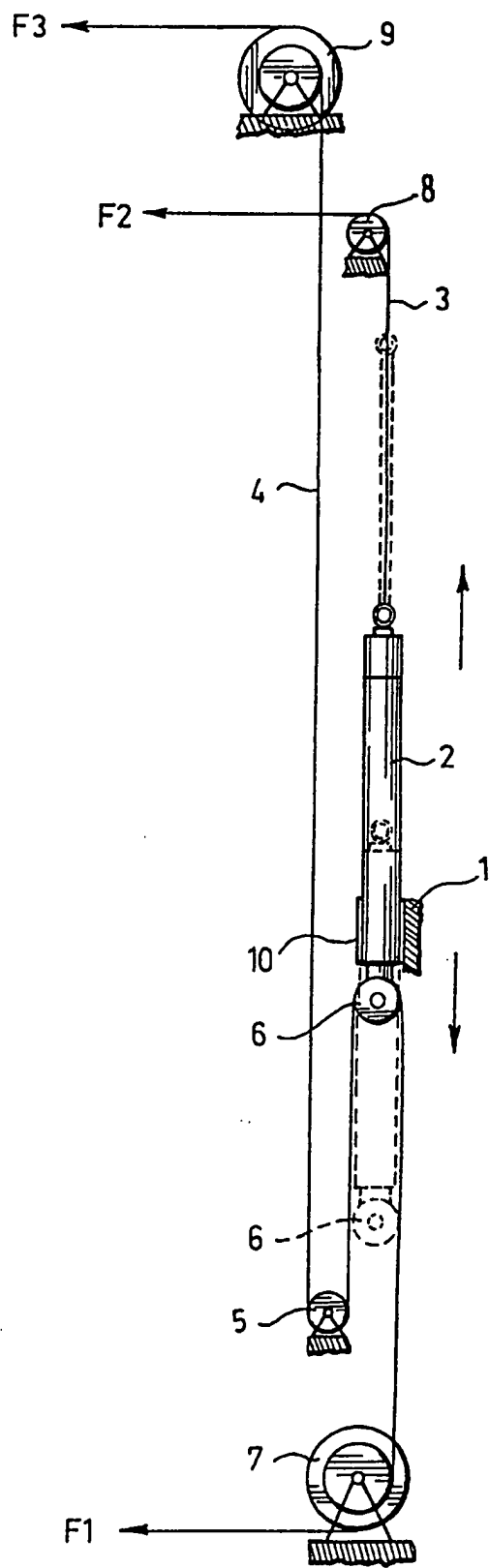
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(54) Pull exercise device

(57) An exercise device comprises a frame 1, a resistance element 2 fitted in the frame 1, at least two flexible pulling means 3, 4 attached to the resistance element 2; and a pulley assembly 5, 6, 7, 8, 9 for guiding the free ends of the pulling means 3, 4 to a desired place. The resistance element 2 is arranged movably in its operating direction with respect to the frame 1. The pulling means 3, 4 are attached to the opposite ends of the resistance element 2. The resistance element may be a hydraulic or pneumatic piston and cylinder device, a rubber spring or a non rubber spring.



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Exercise device

The invention relates to an exercise device comprising a frame, a resistance element fitted in the frame, at least two flexible pulling means attached to the opposite ends of the resistance element; and a pulley assembly for guiding the free ends of the pulling means to a desired place.

Several exercise devices of this type are known from the prior art. Devices presently in use employ weights, springs, rubbers, various cylinders, etc, as resistance elements. In present-day so-called pump-operated exercise devices utilizing a cylinder, for instance, the force is initiated from a single point, that is, from the end of the piston rod, either directly or by means of ropes. The expression the force is initiated means here that the ends of the pulling means, such as ropes, are attached to the same point in the resistance element, for instance, at the end of the piston rod, as mentioned above.

A drawback of prior art devices is that they are complicated and difficult to use. Due to the complicated construction, the operation of these devices is often unsatisfactory: the ropes come off, slacken and become entangled very easily. In addition, prior art devices are very often heavy and large and noisy in use, as a result of which they are difficult to locate. Exercising on prior art devices is often more or less frustrating as the exchange of ropes takes plenty of time. On account of their construction, these devices are often very expensive.

The object of the invention is to provide a device by means of which the drawbacks of the prior art can be eliminated. This is achieved by means of an exercise device of the invention which is charac-

terized in that the resistance element is arranged movably in the frame so that it is movable in its operating direction with respect to the frame.

5 An advantage of the invention is that it is easy to use. Several different exercises can be performed on the device without any separate adjustments. This makes the exercising more meaningful as one loses no time in exchanging the ropes. The device of the invention is also reliable in operation as the
10 movement of the resistance element is simple and the ropes cannot slacken, come off or become entangled. The device of the invention is light in construction, whereby the frame too is light and the device is easy to displace, transport and pack. The device is also
15 very silent as it does not comprise any clattering weights; practically speaking, the rolls, the resistance element and the slide surfaces can be made completely silent. The space requirement of the device of the invention is small as the mechanism
20 itself takes only a little floor space. The usability the device of the invention is good and many-sided. If an adjustable resistance element is used, the load in the device can be adjusted steplessly and easily. The demand of force can be optimized in different
25 exercises by using different kind of transmissions at the different points from which the force is initiated. Still another advantage of the invention is that it is advantageous to manufacture because of the small number of required parts and the low cost
30 of manufacture of the parts. The device of the invention is also safe, as the mechanism is easy to encase within a vertically mounted beam, for instance.

The invention will be described in the following by means of a preferred embodiment shown in the
35 attached drawings, whereby the figure of the drawings

is a general side view of a device of the invention.

In the figure, the reference numeral 1 illustrates generally the frame of the device. The reference numeral 2 indicates a resistance element fitted in the frame 1. The reference numerals 3 and 4 indicate flexible pulling means, and the reference numerals 5, 6, 7, 8 and 9 indicate pulleys by means of which the ends of the flexible pulling means 3, 4 are guided to a desired place.

The basic idea of the invention is to arrange the resistance element 2 in the frame 1 movably in its operating direction. In addition, the flexible pulling means 3, 4 are attached to the opposite ends of the resistance element 2. As used in this text, the expression *movably in its operating direction* means that the resistance element 2 is able to move substantially in the direction in which it, for instance, extends and contracts.

As the resistance element 2 is in this way movable with respect to the frame 1, two force initiation points are provided, that is, the opposite ends of the resistance element. The definition *force initiation point* refers to the point of attachment of the flexible pulling means to the resistance element. This appears clearly from the figure.

The device of the figure operates in such a way that the user pulls on a desired pulling means, whereby the resistance element 2 resists the pulling movement. In the figure, the points at which the user pulls on the pulling means are indicated generally with the references F1, F2 and F3. The significance of the different points at which the pulling movement can be performed is apparent in that the pulling point should be variable for training the muscles of the upper body and the arms from the top position and

from the level of the chest, and the legs from the bottom position, etc.

When using the device of the invention, that end of the resistance element which is not being used
5 has to be locked in position, that is, whenever one of the points F1, F2 or F3 is pulled at, the other points are locked. The locking can be made automatic by suitably dimensioning the pulling means, whereby the unused pulling handles work as stoppers.

10 By means of a pulley block mechanism, several force initiation points can be provided in the device of the invention. In the example of the figure, a pulley block mechanism is provided at the lower end of the resistance element 2, whereby the device com-
15 prises three force initiation points. In theory, the number of the force initiation points is unlimited; in practice, however, a maximum of four such points is easily realizable. The function of the pulley block is to keep all the pulling means tight and, of
20 course, to vary the transmission. The pulley block can be positioned on one or both sides of the resistance element or it can be omitted.

In addition to said pulley block mechanism, the example of the figure comprises an additional
25 transmission for the forces F1 and F3 in order to multiply the relatively short movement of the resistance element. The use of the additional transmission, however, is not necessary for the operation of the device.

30 In the example of the figure, the resistance element is made movable by means of a slide sleeve 10, whereby the movement of the resistance element is well-supported and appropriately sensitive. A further advantage of this embodiment is that it is simple and
35 requires little service. The movement of the

resistance element can also be effected in some other way than by means of the slide sleeve. In cases where the resistance element is a cylinder means, the piston rod and the lower end of the cylinder part can be provided with eyelets in which shafts provided at the ends with rolls bearing on the frame are positioned.

The above embodiment is by no means intended to restrict the invention, but the invention can be modified within the scope of the claims as desired. Accordingly, it is to be understood that the device of the invention or its parts need not necessarily be exactly similar to those shown in the figure, but other solutions are possible as well. The resistance element can be a liquid cylinder or an air cylinder, a draw-spring, a rubber spring, or any other suitable element. The flexible pulling means may be a rope or some other suitable means. The device of the invention and its different parts can be made of any suitable material, such as metal and plastic. The resistance element need not necessarily be provided with a slide surface or rolls, but it is equally possible to fit it on the pulling means so that it moves longitudinally in the air, etc.

Claims:

1. An exercise device comprising a frame, a
resistance element fitted in the frame, at
5 least two flexible pulling means attached to
the opposite ends of the resistance element; and
a pulley assembly for guiding the
free ends of the pulling means to a desired place,
characterized in that the resistance
10 element is supported movably on the frame so
that it is movable in its operating direction with
respect to the frame.

2. An exercise device according to claim 1,
characterized in that the resistance
15 element is supported on the frame by means of
a slide sleeve.

3. An exercise device according to claim 1 or
2, characterized in that the resistance
element is a cylinder means.

20 4. An exercise device according to claim 1 or
2, characterized in that the resistance
element is a spring member.